samples of cylinders charged with acetylene shall be tested with satisfactory results in accordance with CGA Pamphlet C–12.

(1) The specific gravity of acetone solvent in acetylene cylinders must be 0.796 or over at 15.5 °C. (59.9 °F.).

(2) The amount of solvent added in the refilling operation must not cause the tare weight of the cylinder to exceed its marked tare weight. The tare weight includes the weight of the cylinder shell, porous filling, valve, safety relief devices and solvent, but without removable cap.

(b) *Filling limits.* The pressure in cylinders containing acetylene gas must not exceed 250 psi at 70 °F., and in case the cylinders are marked for a lower allowable charging pressure, at 70 °F., then that pressure must not be exceeded.

(c) *Data requirements on filler and solvent.* Cylinders containing acetylene gas must not be shipped unless they were charged by or with the consent of the owner, and by a person, firm, or company having possession of complete information as to the nature of the porous filling, the kind and quantity of solvent in the cylinders, and the meaning of such markings on the cylinders as are prescribed by the Department's regulations and specifications applying to containers for the transportation of acetylene gas.

(d) *Verification of container pressure.* (1) Each day, the pressure in a container representative of that day's compression must be checked by the charging plant after the container has cooled to a settled temperature and a record of this test kept for at least 30 days.

(e) *Prefill requirements.* Before each filling of an acetylene cylinder, the person filling the cylinder must visually inspect the outside of the cylinder in accordance with the prefill requirements contained in CGA Pamphlet C–13, Section 3.

[29 FR 18743, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §173.303, see the List of CFR Sections Affected appearing in the Finding Aids section of this volume.

§173.304 Charging of cylinders with liquefied compressed gas.

(a) *Detailed charging requirements.* Liquefied gases shall be charged in accordance with the specific provisions of paragraph (a)(2) of this section or paragraph (e) of this section. Where charging requirements are not specifically prescribed, liquefied gases, except gas in solution, must be shipped, subject to the applicable paragraphs under General Requirements for Shipment (see §173.301), the charging requirements of this section for liquefied compressed gas, or the charging requirements for mixtures (see §173.305), in containers manufactured under specifications, as follows:

(1) Specification 3,[1] 3A, 3AA, 3B, 3BN, 3D[1] 3E, 4,[1] 4A,[1] 4B, 4BA, 4B240ET, 4BW, 4E, 9,[1] 25,[1] 26,[1] 38,[1] 39, 40,[1] or 41,[1] (§§178.36, 178.37, 178.38, 178.39, 178.42, 178.50, 178.51, 178.55, 178.61, 178.65, 178.68 of this subchapter), except that no Specification 4E, 9, 39, 40, 41 packaging may be charged and shipped with a mixture containing a pyroforic liquid, carbon bisulfide (disulfide), ethyl chloride, ethylene oxide, nickel carbonyl, spirits of nitroglycerin, or poisonous material (Division 6.1 or 2.3), unless specifically authorized in this part.

(2) The following requirements must be complied with for the gases named (for cryogenic liquids, see §173.316):

[1] Use of existing cylinders authorized, but new construction not authorized.

Kind of gas	Maximum permitted filling density (percent) (see Note 1)	Containers marked as shown in this column or of the same type with higher service pressure must be used except as provided in § 173.34 (a), (b), § 173.301(j) (see notes following table)
Anhydrous ammonia	54	DOT–4; DOT–3A480; DOT–3AA480; DOT–3A480X; DOT–4A480; DOT–3; DOT–4AA480; DOT–3E1800; DOT–3AL480.
Bromotri- fluoro- methane (R–13B1 or H–1301)	124	DOT–3A400; DOT–3AA400; DOT–3B400; DOT–4A400; DOT–4AA480; DOT–4B400; DOT–4BA400; DOT–4BW400; DOT–3E1800; DOT–39; DOT–3AL400.
Carbon dioxide (see notes 4, 7, and 8)	68	DOT–3A1800; DOT–3AX1800; DOT–3AA1800; DOT–3AAX1800; DOT–3; DOT–3E1800; DOT–3T1800; DOT–3HT2000; DOT–39; DOT–3AL1800.
Carbon dioxide, refrigerated liquid (see paragraph (h)).		DOT–4L.
Chlorine (see Note 2)	125	DOT–3A480; DOT–3AA480; DOT–25; DOT–3; DOT–3BN480; DOT–3E1800.
Chlorodifluroethane (R-142b) *or* 1-chloro-1, 1-difluoroethane (see Note 8).	100	DOT–3A150; DOT–3AA150; DOT–3B150; DOT–4B150; DOT–4BA225; DOT–4BW225; DOT–3E1800; DOT–39, DOT–3AL150.
Chlorodifluoromethane (R-22) (see Note 8)	105	DOT–3A240; DOT–3AA240; DOT–3B240; DOT–4B240; DOT–4BA240; DOT–4BW240; DOT–4B240ET; DOT–4E240; DOT–39; DOT–41; DOT–3E1800; and DOT–3ALA240.
Chloropentafluorethane, (R–115)	110	DOT–3A225; DOT–3AA225; DOT–3B225; DOT–4A225; DOT–4BA225; DOT–4B225; DOT–4BW225; DOT–3E1800; DOT–39; and DOT–3AL225.
Chlorotrifluoromethane (R-13) (see Note 8)	100	DOT–3A1800; DOT–3AA1800; DOT–3; DOT–3E1800; DOT–39; and DOT–3AL1800.
Cyclopropane (see Notes 8 and 9)	55	DOT–3A225; DOT–3A480X; DOT–3AA225; DOT–3B225; DOT–4A225; DOT–4AA480; DOT–4B225; DOT–4BA225; DOT–4BW225; DOT–4B240ET; DOT–3; DOT–3E1800; DOT–39; and DOT–3AL225.
Dichlorodifluoromethane (R-12) (see Note 8)	119	DOT–3A225; DOT–3AA225; DOT–3B225; DOT–4A225; DOT–4B225; DOT–4BA225; DOT–4BW225; DOT–4B240ET; DOT–4E225; DOT–9; DOT–39; DOT–41; DOT–3E1800; and DOT–3AL225.
Dichlorodifluoromethane and difluoroethane mixture (constant boiling mixture) (R–500) (see Note 8).	Not liquid full at 130 °F	DOT–3A240; DOT–3AA240, DOT–3B240; DOT–3E1800; DOT–4A240; DOT–4B240; DOT–4BA240; DOT–4BW240; DOT–4E240; DOT–9, DOT–39.
Difluoroethane (R–152a) (see Note 8)	79	DOT–3A150; DOT–3AA150; DOT–3B150; DOT–4B150; DOT–4BA225; DOT–4BW225; DOT–3E1800; DOT–3AL150.
1,1-Difluoroethylene (R–1132A)	73	DOT–3A2200, DOT–3AA2200, DOT–3AX2200, DOT–3AAX2200, DOT–3T2200, DOT–39.
Dimethylamine, anhydrous	59	DOT–3A150; DOT–3AA150; DOT–3B150; DOT–4B150 DOT–4BA225; DOT–4BW225; ICC–3E1800.
Ethane (see Notes 8 and 9)	35.8	DOT–3A1800; DOT–3AX1800; DOT–3AA1800; DOT–3AAX1800; DOT–3; DOT–3E1800; DOT–3T1800; DOT–39; DOT–3AL1800.
Ethane (see Notes 8 and 9)	36.8	DOT–3A2000; DOT–3AX2000; DOT–3AA2000; DOT–3AAX2000; DOT–3T2000; DOT–39; DOT–3AL2000.
Ethylene (see Notes 8 and 9)	31.0	DOT–3A1800; DOT–3AX1800 DOT–3AA1800; DOT–3AAX1800; DOT–3; DOT–3E1800; DOT–3T1800; DOT–39; and DOT–3AL1800 .
Ethylene (see Notes 8 and 9)	32.5	DOT–3A2000; DOT–3AX2000; DOT–3AA2000; DOT–3AAX2000; DOT–3T2000; DOT–39; and DOT–3AL2000.
Ethylene (see Notes 8 and 9)	35.5	DOT–3A2400; DOT–3AX2400; DOT–3AA2400; DOT–3AAX2400; DOT–3T2400; DOT–39; DOT–3AL2400.
Hydrogen chloride	65	DOT–3A1800; DOT–3AA1800; DOT–3AX1800; DOT–3AAX1800; DOT–3; DOT–3T1800; DOT–3E1800.

Kind of gas	Maximum permitted filling density (percent) (see Note 1)	Containers marked as shown in this column or of the same type with higher service pressure must be used except as provided in § 173.34 (a), (b), § 173.301(j) (see notes following table)
Hydrogen sulfide (see Note 10)	62.5	DOT–3A480; DOT–3AA480; DOT–3B480; DOT–4A480; DOT–4B480; DOT–4BA480; DOT–4BW480.; DOT–26–480; DOT–3E1800; DOT–3AL480.
Insecticide, liquefied gas (See Notes 8 and 12)	Not liquid full at 130 °F	DOT–3A300; DOT–3AA300; DOT–3B300; DOT–4B300; DOT–4BA300; DOT–4BW300; DOT–9; DOT–40; DOT–41; DOT–3E1800.
Liquefied nonflammable gases, liquid other than those classified as flammable, corrosive, or poisonous, and mixtures or solutions thereof, charged with nitrogen, carbon dioxide, or air (see Notes 7 and 8).	Not liquid full at 130 °F	Specification packaging authorized in paragraph (a)(1) of this section and DOT–3HT; DOT–4D; DOT–4DA; DOT–4DS.
Methylacetylene-propadiene, stabilized (see Note 5).	Not liquid full at 130 °F	DOT–4B240 without brazed seams; DOT–4BA240 without brazed seams; DOT–3A240; DOT–3AA240; DOT–3B240; DOT–3E1800; DOT–4BW240; DOT–4E240; DOT–4B240ET; DOT–4; DOT–41; DOT–3AL240.
Methyl chloride	84	DOT–3A225; DOT–3AA225; DOT–3B225; DOT–4A225; DOT–4B225; DOT–4BA225; DOT–4BW225; DOT–3; DOT–4; DOT–25; DOT–26–300; DOT–38; DOT–3E1800; DOT–4B240ET. Cylinders complying with DOT–3A150; DOT–3B150; DOT–4A150, and DOT–4B150 manufactured prior to Dec. 7, 1936 are also authorized.
Methyl mercaptan	80	DOT–3A240; DOT–3AA240; DOT–3B240; DOT–4B240; DOT–4B240ET; DOT–3E1800; DOT–4BA240; DOT–4BW240.
Monomethylamine, anhydrous	60	DOT–3A150; DOT–3AA150; DOT–3B150; DOT–4B150; DOT–4BA225; DOT–4BW225; DOT–3E1800.
Nitrosyl chloride	110	DOT–3BN400 only.
Nitrous oxide (see Notes 7, 8, and 11)	68	DOT–3A1800; DOT–3AX1800; DOT–3AA1800; DOT–3AAX1800; DOT–3; DOT–3E1800; DOT–3T1800; DOT–3HT2000; DOT–39; DOT–.AL1800.
Nitrous oxide, refrigerated liquid (see paragraph (h)).		DOT–4L.
Refrigerant gas, n.o.s. or Dispersant gas, n.o.s. (see Notes 8 and 13).	Not liquid full at 130 °F	DOT–3A240; DOT–3AA240; DOT–3B240; DOT–3E1800; DOT–4A240; DOT–4B240; DOT–4BA240; DOT–4BW240; DOT–4E240; DOT–9; DOT–39; and DOT–3AL240.
Sulfur dioxide (see note 8)	125	DOT–3A225; DOT–3AA225; DOT–3B225; DOT–4A225; DOT–4B225; DOT–4BA225; DOT–4BW225; DOT–4B240ET; DOT–3; DOT–4; DOT–25; DOT–26–150; DOT–38; DOT–39; DOT–3E1800; and DOT–3AL225.
Sulfur hexafluoride	120	DOT–3A1000; DOT–3AA1000; DOT–3AAX2400; DOT–3; DOT–3AL1000; DOT–3E1800; DOT–3T1800.
Sulfuryl fluoride	106	DOT–3A480; DOT–3AA480; DOT–3E1800; DOT–4B480; DOT–4BA480; DOT–4BW480.
Tetrafluoroethylene, inhibited	90	DOT–3A1200; DOT–3AA1200; DOT–3E1800.
Trifluorochloroethylene	115	DOT–3A300; DOT–3AA300; DOT–3B300; DOT–4A300; DOT–4B300; DOT–4BA300; DOT–4BW300; DOT–3E1800.
Trimethylamine, anhydrous	57	DOT–3A150; DOT–3AA150; DOT–3B150; DOT–4B150; DOT–4BA225; DOT–4BW225; DOT–3E1800.
Vinyl chloride (see Note 5)	84	DOT–4B150 without brazed seams; DOT–4BA225 without brazed seams; DOT–4BW225; DOT–3A150; DOT–3AA150; DOT–25; DOT–3E1800; DOT–3AL150.
Vinyl fluoride, inhibited	62	DOT–3A1800; DOT–3AA1800; DOT–3E1800; DOT–3AL1800.
Vinyl methyl ether (see Note 5)	68	DOT–4B150, without brazed seams; DOT–4BA225 without brazed seams; DOT–4BW225; DOT–3A150; DOT–3AA150; DOT–3B150; DOT–25; DOT–3E1800.

NOTE 1: The ''filling density'' is hereby defined as the percent ratio of the weight of gas in a container to the weight of water that the container will hold at 60 °F. (1 lb of water=27.737 cubic inches at 60 °F.).

NOTE 2: Cylinders purchased after Oct. 1, 1944, for the transportation of chlorine must contain no aperture other than that provided in the neck of the cylinder for attachment of a valve equipped with an approved safety relief device. Cylinders purchased after Nov. 1, 1935, and charged with chlorine must not contain over 150 pounds of gas.

NOTE 3: [Reserved]

NOTE 4: Special carbon dioxide mining devices containing a heating element and charged with not over 6 pounds of carbon dioxide may be filled to a density of not over 85 percent, provided the cylinder is made of steel with a calculated bursting pressure in excess of 39,000 psi, be fitted with a frangible disc that will operate at not over 57 percent of that pressure, and be able to withstand a drop of 10 feet when striking crosswise on a steel rail while under a pressure of at least 3,000 psi. Such devices must be shipped in strong boxes or must be wrapped in heavy burlap and bound by 12-gauge wire with the wire completely covered by friction tape. Wrapping must be applied so as not to interfere with the functioning of the frangible disc safety relief device. Shipments must be described as ''liquefied carbon dioxide gas (mining device)'' and marked, labeled, and certified as prescribed for liquefied carbon dioxide.

NOTE 5: All parts of valve and safety relief devices in contact with contents of cylinders must be of a metal or other material, suitably treated if necessary, which will not cause formation of any acetylides.

NOTE 6: [Reserved]

NOTE 7: Specification 3HT cylinders for aircraft use only, having a maximum service life of 24 years. Authorized only for nonflammable gases. Cylinders must be equipped with pressure relief devices only of the frangible disc type which meet the requirements of § 173.34(d). Each frangible disc must have a rated bursting pressure which does not exceed 90 percent of the minimum required test pressure of the cylinder. Discs with fusible metal backing are not permitted. Cylinders may be shipped only when packed in strong outside packagings.

NOTE 8: See § 173.301(k).

NOTE 9: When used for shipment of flammable gases, the internal volume of a specification 39 cylinder must not exceed 75 cubic inches.

NOTE 10: Each valve outlet must be sealed by a threaded cap or a threaded solid plug.

NOTE 11: See § 173.304(a)(4).

NOTE 12: For an insecticide gas which is nonpoisonous and nonflammable, see § 173.305(c).

NOTE 13: For a refrigerant or dispersant gas which is nonpoisonous and nonflammable, see § 173.304(e).

(3) Specification 3AL (§ 178.46 of this subchapter) cylinders are authorized for the following liquefied gases: cyclobutane, hydrogen selenide, propylene, silane, carbonyl sulfide, vinyl bromide, and dimethyl ether. Shipments of flammable gases are authorized only when transported by highway, rail and cargo aircraft only.

(4) Specification DOT 3AL (§ 178.46 of this subchapter) cylinders when used in nitrous oxide service must be in compliance with the following conditions:

(i) Cylinder must be equipped only with brass or stainless steel valve; and

(ii) Each cylinder must be cleaned in compliance with the requirements of Federal Specification RR–C–901c paragraphs 3.7.2 and 3.8.2. Cleaning agents equivalent to those specified in RR–C–901c may be used; however, any cleaning agent must not be capable of reacting with oxygen. One cylinder selected at random from a group of 200 or less cleaned at the same time must be tested for oil contamination in accordance with Specification RR–C–901c paragraph 4.4.2.3 and meet the standard of cleanliness specified.

(b) *Filling limits.* Except for carbon dioxide, 1,1–Difluoroethylene (R–1132A), nitrous oxide and vinyl fluoride, inhibited, the liquid portion of a liquefied gas must not completely fill the packaging at any temperature up to and including 130 °F. The liquid portion of vinyl fluoride, inhibited, may completely fill the cylinder at 130 °F. provided the pressure at the critical temperature does not exceed one and one-fourth times the service pressure.

(c) *Verification of content in cylinder.* (1) Liquefied gases must be charged by weight, by volume measurement of liquid, charging line, by the use of proper scales or when lower in pressure than required for liquefaction a pressure-temperature chart may be used in charging to insure that the service pressure at 70 °F. times 5/4 will not be exceeded at 130 °F.

(2) Except as noted in paragraph (d)(4) of this section, the amount of liquefied gas charged into a container must be determined by weight, or if charged at a pressure lower than the liquefaction point, by pressure shown on a chart for the specific gas. Weight must be checked, after disconnecting from the charging line, by the use of proper scales.

(d) *Requirements for liquefied petroleum gas.* (1) Filling density limited as follows:

Minimum specific gravity of the liquid material at 60 °F.	Maximum filling density in percent of the water-weight capacity of the container
0.271 to 0.289	26
0.290 to 0.306	27
0.307 to 0.322	28
0.323 to 0.338	29
0.339 to 0.354	30
0.355 to 0.371	31
0.372 to 0.398	32
0.399 to 0.425	33
0.426 to 0.440	34
0.441 to 0.452	35
0.453 to 0.462	36
0.463 to 0.472	37
0.473 to 0.480	38
0.481 to 0.488	39
0.489 to 0.495	40
0.496 to 0.503	41
0.504 to 0.510	42
0.511 to 0.519	43
0.520 to 0.527	44
0.528 to 0.536	45
0.537 to 0.544	46
0.545 to 0.552	47
0.553 to 0.560	48
0.561 to 0.568	49
0.569 to 0.576	50
0.577 to 0.584	51
0.585 to 0.592	52
0.593 to 0.600	53
0.601 to 0.608	54
0.609 to 0.617	55
0.618 to 0.626	56
0.627 to 0.634	57

(2) Subject to §173.301(f), any filling density percentage prescribed in this section is authorized to be increased by 2 for liquefied petroleum gas in Spec. 26 or 3 cylinders or in Spec. 3A marked for 1,800 psig, or higher, service pressure.

(3) Liquefied petroleum gas must be shipped in specification containers as follows:

(i) Specification 3,[1] 3A, 3AA, 3B, 3E, 3AL, 4B, 4BA, 4B240FLW, 4B240ET, 4BW, 4B240X,[1] 4E, 4,[1] 4A,[1] 9,[1] 25,[1] 26,[1] 38,[1] 39, or 41[1] (§§178.36, 178.37, 178.38, 178.42, 178.46, 178.50, 178.51, 178.54, 178.55, 178.61, 178.65, 178.68 of this subchapter) cylinders. The internal volume of a Specification 39 cylinder must not exceed 75 cubic inches. Shipments of flammable gases in 3AL cylinders are authorized only when transported by highway, rail and cargo–only aircraft.

NOTE 1: Cylinders marked as complying with DOT Spec. 4B240FLW bearing manufacturer's symbol WCO and serial numbers 47A–1 to 47A–59200, inclusive, varying from the specification requirements as to physical properties of steel, are authorized for the transportation of liquefied petroleum gases.

(ii) Additional containers may be used within the limits of quantity and pressure as follows:

Type of container	Maximum capacity		Maximum charging pressure—p.s.i.g.
	Cubic inches	Gallons	
DOT–2P or DOT–2Q (see Note 1)	31.83		45 p.s.i.g. at 70 °F. and 105 p.s.i.g. at 130 °F. (see Note 2).
DOT–2P or DOT–2Q (see Note 1)	31.83		35 p.s.i.g. at 70 °F. and 100 p.s.i.g. at 130 °F.
DOT–3C or DOT–4C	3,881	16+5% tolerance	145 p.s.i.g. at 130 °F.

NOTE 1: Containers must be packed in strong wooden or fiber boxes of such design as to protect valves from injury or accidental functioning under conditions incident to transportation. Each completed container filled for shipment must have been heated until contents reached a minimum temperature of 130 °F., without evidence of leakage, distortion, or other defect. Each outside shipping container must be plainly marked ''INSIDE CONTAINERS COMPLY WITH PRESCRIBED SPECIFICATIONS.''

NOTE 2: Containers must be equipped with safety relief devices which will prevent rupture of the containers and dangerous projection of the closing devices when the containers are exposed to the action of fire.

(4) Verification of content. Containers with a water capacity of 200 pounds or more and for use with a liquefied petroleum gas with a specific gravity at 60 °F. of 0.504 or greater may have their contents determined by using a fixed length dip tube gauging device. The length of the dip tube shall be such that when a liquefied petroleum gas with a specific volume of 0.03051 cu. ft./lb. at a temperature of 40

[1] Use of existing cylinders authorized, but new construction not authorized.

°F. is charged into the container it just reaches the bottom of the tube. The weight of this liquid shall not exceed 42 percent of the water capacity of the container which must be stamped thereon. The length of the dip tube, expre ssed in inches carried out to one decimal place and prefixed with the letters ''DT'' shall be stamped on the container and on the exterior of removable type dip tube; for the purpose of this requirement the marked length shall be expressed as the distance measured along the axis of a straight tube from the top of the boss through which the tube is inserted to the proper level of the liquid in the container. The length of each dip tube shall be checked when installed by weighing each container after filling except when installed in groups of substantially identical containers in which case one of each 25 containers shall be weighed. The quantity of liquefied gas in each container must be checked by means of the dip tube after disconnecting from the charging line. The outlet from the dip tube shall be not larger than a No. 54 drill size orifice. A container representative of each day's filling at each charging plant shall have its contents checked by weighing after disconnecting from the charging line.

(e) *Refrigerant gases.* Refrigerant gases which are nonpoisonous and nonflammable under this part, must be shipped in cylinders as prescribed in paragraph (a) (1) or (2) of this section, or as follows:

(1) Specifications 2P and 2Q (§§ 178.33, 178.33a of this subchapter). Inside metal containers packed in a strong wooden or fiberboard box of such design as to protect valves from injury or accidental functioning under conditions incident to transportation. Pressure in the container must not exceed 85 pounds per square inch absolute at 70 °F. Each completed metal container filled for shipment must be heated until content reaches a minimum temperature of 130 °F. without evidence of leakage, distortion, or other defect. Each outside shipping container must be plainly marked ''Inside Containers Comply With Prescribed Specification.''

(2) [Reserved]

(f) *Engine starting fluid.* Engine starting fluid containing compressed gas or gases which are flammable under this part must be shipped in cylinders as prescribed in paragraph (a)(1) of this section, or as follows:

(1) Inside nonrefillable metal containers having a capacity not over 32 cubic inches. Containers must be packaged in strong, tight packagings. Pressure in the container must not exceed 140 psi, absolute, at 130 °F. However, if the pressure exceeds 140 psi, absolute at 130 °F., a Spec. 2P (§ 178.33 of this subchapter) container must be used. In any event, the metal container must be capable of withstanding without bursting a pressure of one and one-half times the pressure of the content at 130 °F. The liquid content of the material and gas must not completely fill the container at 130 °F. Each completed container filled for shipment must have been heated until content reaches a minimum temperature of 130 °F., without evidence of leakage, distortion, or other defect. Each outside shipping container must be plainly marked, ''INSIDE CONTAINERS COMPLY WITH PRESCRIBED SPECIFICATIONS.''

(2) [Reserved]

(g) *Poisonous mixtures.* Cylinders containing poison gases and poison gas mixtures meeting Division 2.3 *Hazard Zone A* must conform to the requirements of § 173.40 of this part.

(h) *Carbon dioxide, refrigerated liquid or nitrous oxide, refrigerated liquid.* (1) The following provisions apply to carbon dioxide, refrigerated liquid and nitrous oxide, refrigerated liquid:

(i) DOT 4L cylinders conforming to the provisions of this paragraph are authorized.

(ii) Each cylinder must be protected with at least one pressure relief valve and at least one frangible disc conforming to §§ 173.34(d) and 173.304(a)(2). The relieving capacity of the pressure relief device system must be equal to or greater than that calculated by the applicable formula in paragraph 5.9 of CGA Pamphlet S–1.1.

(iii) The temperature and pressure of the gas at the time of loading may not exceed −18 °C (0 °F) and 2007 kPa (291 psig) for carbon dioxide and −15.6 °C

(+4 °F) and 2007 kPa (291 psig) for nitrous oxide. Maximum time in transit may not exceed 120 hours.

(2) The following pressure control valve settings, design service temperatures and filling densities apply:

Pressure control valve setting maximum start—to discharge gauge pressure in kPa (psig)	Maximum permitted filling density (percent by weight)	
	Carbon dioxide, refrigerated liquid	Nitrous oxide, refrigerated liquid
724 kPa (105 psig)	108	104
1172 kPa (170 psig)	105	101
1586 kPa (230 psig)	104	99
2034 kPa (295 psig)	102	97
2483 kPa (360 psig)	100	95
3103 kPa (450 psig)	98	83
3723 kPa (540 psig)	92	87
4309 kPa (625 psig)	86	80
Design service temperature °C (°F)	−196 °C (−320 °F)	−196 °C (−320 °F)

[29 FR 18743, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §173.304, see the List of CFR Sections Affected appearing in the Finding Aids section of this volume.

§173.305 Charging of cylinders with a mixture of compressed gas and other material.

(a) *Detailed requirements.* A mixture of a compressed gas and any other material must be shipped as a compressed gas if the mixture is a compressed gas as designated in §173.115 and when not in violation of §173.301(a).

(b) *Filling limits.* (See §173.301(e).) For mixtures, the liquid portion of the liquefied compressed gas at 130 °F. plus any additional liquid or solid must not completely fill the container.

(c) *Nonpoisonous and nonflammable mixtures.* Mixtures containing compressed gas or gases including insecticides, which mixtures are nonpoisonous and nonflammable under this part must be shipped in cylinders as prescribed in §173.304(a) or as follows:

(1) Specification 2P (§178.33 of this subchapter). Inside metal containers equipped with safety relief devices of a type examined by the Bureau of Explosives and approved by the Associate Administrator for Hazardous Materials Safety, and packed in strong wooden or fiber boxes of such design as to protect valves from injury or accidental functioning under conditions incident to transportation. Pressure in the container may not exceed 85 psia at 70 °F. Each completed metal container filled for shipment must be heated until content reaches a minimum temperature of 130 °F., without evidence of leakage, distortion or other defect. Each outside shipping container must be plainly marked ''INSIDE CONTAINERS COMPLY WITH PRESCRIBED SPECIFICATIONS.''

(2) [Reserved]

(d) *Poisonous mixtures.* A mixture containing any poisonous material (Division 6.1 or 2.3) in such proportions that the mixture would be classed as poisonous under §173.115 or §173.132 must be shipped in packagings as authorized for these poisonous materials.

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§173.306 Limited quantities of compressed gases.

(a) Limited quantities of compressed gases for which exceptions are permitted as noted by reference to this section in §172.101 of this subchapter are excepted from labeling (except when offered for transportation by air) and, unless required as a condition of the exception, specification packaging requirements of this subchapter when packed in accordance with the following paragraphs. In addition, shipments are not subject to subpart F of part 172 of this subchapter, to part 174 of this subchapter except §174.24 and to part 177 of this subchapter except §177.817. Each package may not exceed 30 kg (66 pounds) gross weight.